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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,856	03/04/2004	Shigeru Shirayone	648.43608X00	5252
20457 7590 01/02/2008 ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-3873			EXAMINER EL ARINI, ZEINAB	
			ART UNIT 1792	PAPER NUMBER
			MAIL DATE 01/02/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/791,856

Applicant(s)

SHIRAYONE ET AL.

Examiner

Zeinab E. EL-Arini

Art Unit

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,8-10 and 13-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,8-10 and 13-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The amendment and remarks filed on 9/27/07 have been acknowledged and entered.

Claim Rejections - 35 USC § 112

The rejection under 35 U.S.C. 112, second paragraph, stated in paper No. 20070621 has been withdrawn in view of applicants' amendment.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 8-10, and 13-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 09-171999 (JP'999) or JP 2000-012515 (JP'515) or JP 11-186226 (JP'226) in combination with JP 07-130706 (JP'706) or JP 2001-308068 (JP'068) and JP 09-186143 (JP'143) and Benzing (4,786,352).

2. JP'999 teaches a plasma cleaning method using a BCL3 gas and chlorine gas. The reference discloses removing the aluminum deposits. See the abstract

JP'515 or JP'226 teaches a plasma cleaning method using a BCL3 gas and chlorine gas, see the abstract.

The references do not teach the hydrobromic gas, the frequency, introducing a mixed gas of hydrobromic gas and chlorine gas into the processing chamber and

generating plasma, while the Si wafer is mounted on the electrode, and the ratio as claimed.

JP'143 discloses introducing a reactant gas in which plasma production is possible, while the semiconductor wafer is mounted on the electrode. See claim 8. Re. claims 13, 15, 17, see claim 3, and re. claim 14, see claims 9 and 13.

Benzing teaches an apparatus and method for in-situ camber cleaning. The reference discloses introducing hydrobromic gas, chlorine gas, CF₃CL, CF₃BR, CCL₄, BCL₃, HCL, or combination thereof, see col. 5, lines 25-40. The reference discloses the power as claimed, see col. 5, line 16, col. 6, line 13, col. 8, line 60, and col. 9, line 47.

It would have been obvious for one skilled in the art to use the hydrobromic gas taught by Benzing in the process taught by JP'999 or JP'515 or JP'226 to obtain the claimed process, see Benzing, col. 5, lines 25-40. It would have been obvious for one skilled in the art to introduce the gas mixture on the wafer, while is mounted on the electrode as taught by JP'143 to enhance the cleaning process. The additional element as claimed is inherent in the cited arts, because the wall of the reaction chamber and the object inside the chamber may contains Si which can react with the fluorine as claimed.

JP'706 or JP'068 teaches a method of cleaning chamber of etching apparatus comprises removing aluminum-based deposit by using plasma generated with the CL₂ at high frequency voltage. See the abstract.

It would have been obvious for one skilled in the art to use the process taught by JP'999 or JP'515 or JP'226 (including the chlorine and plasma) to remove the aluminum-based deposit, because chlorine plasma as taught by JP'706 or JP'068 can be used to remove the aluminum-based deposit.

Claims 1, 3, 8-10, and 13-17 are rejected under 35 U.S.C. 103(a) as being JP 09-186143 (JP'143) in combination with Benzing.

JP'143 teaches all limitation with the exception of using hydrobromic gas and the frequency as claimed.

Re claims 1, 3, 8-10, and 13-17, see JP'143, the abstract, the claims. Re. claims 13, 15 and 17, see claim 3. Re claim 14, see claims 9, 13.

Benzing teaches an apparatus and method for in-situ camber cleaning. The reference discloses introducing hydrobromic gas, chlorine gas, CF₃CL, CF₃BR, CCL₄, BCL₃, HCL, or combination thereof, see col. 5, lines 25-40. The reference discloses the power as claimed, see col. 5, line 16, col. 6, line 13, col. 8, line 60, and col. 9, line 47. Re. claim 10, see Benzing, col. 1, lines 54-57

It would have been obvious for one skilled in the art to use the hydrobromic gas and the frequency taught by Benzing in the JP'143 to obtain the claimed process. This is because Benzing introduce chlorine gas and hydrobromic gas or BCL₃ to produce the plasma for cleaning the processing chamber or the substrate placed within the chamber.

3. Claims 3,10,13-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benzing (4,786,352).

Benzing teaches an apparatus and method for in-situ camber cleaning. The reference discloses introducing hydrobromic gas, chlorine gas, CF₃CL, CF₃BR, CCL₄, BCL₃, HCL, or combination thereof, see col. 5, lines 25-40. The reference discloses the power as claimed, see col. 5, line 16, col. 6, line 13, col. 8, line 60, and col. 9, line 47. Re. claim 10, see Benzing, col. 1, lines 54-57.

The reference teaches all limitation with the exception of removing aluminum fluoride deposit adhered to the interior of the processing chamber.

It would have been obvious for one skilled in the art to use the process taught by Benzing to remove the deposits as claimed, because it is inherent in the Benzing process. This is also because Benzing uses the same cleaning gas to produce plasma to remove the deposits, therefor the process taught by Benzing is able to remove the deposits as claimed.

Response to Arguments

Applicant's arguments filed 9/27/07 have been fully considered but they are not persuasive. Applicants' argument with respect to the cited prior art do not teach introduction of the mixed gas and generating plasma while the SI wafer is mounted on the electrode, and the plasma containing chlorine and hydrobromic gasses additionally contains SI (element that reacts with fluorine to create a gas-phase reaction product), is unpersuasive, For the reason set forth in JP'143, which teaches introducing the reactant gas into the chamber, while semiconductor is mounted on electrode, see claim 8, and

with respect to the plasma generating gas additionally contains an element that react with fluorine, applicants' argument is unpersuasive, because the chamber wall and the object to be clean may contain Si.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeinab E. EL-Arini whose telephone number is 571-272-1301. The examiner can normally be reached on Monday.-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Zeinab E EL-Arini
Zeinab E EL-Arini
Primary Examiner
Art Unit 1792

ZEE
12/23/07